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DRY LAND AGRICULTURE

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REPORT FOR THE MONTH OF NOVEMBER, 1938

HAVRE:

The mean temperature of 29° for the month of November was slightly below normal. Precipitation occurred on seven days, the total snowfall being 5.3 inches, with only a trace on the ground at the end of the month. The highest temperature was 57° on the 3rd and the lowest -5° on the 20th. The wind movement was slightly above average, but there were no severe blows. In general, winter grains appear in good condition and have sufficient surface moisture. Fall sown crested wheatgrass emerged with very good stands and has made satisfactory growth.

The beef cattle cow herd was brought down from the mountain lease about the middle of the month. Preparations for winter feeding experiments, to begin shortly, are now completed.

A W.P.A. crew has been engaged in gravelling station roads and making miscellaneous repairs to buildings and grounds.

Precipitation, 0.21 inch; snowfall, 5.3 inches.

JUDITH BASIN:

November was dry and windy. Conditions that seemed favorable at the beginning of the month were gradually lost. Although on a few days temperatures were below zero, the month as a whole was not cold. Much of the moisture received last month was lost because of excessive wind. On five days during the month the 24 hour average was more than 10 miles per hour with a maximum on the 18th of 16.5 miles per hour for each hour of the day. There was much soil movement and some drifting, especially along roads, around buildings, etc.

Work on the station during the month consisted mainly of caring for livestock, making repairs to buildings, and odd jobs.

Maximum temperature, 59°; minimum, -7°; precipitation, 0.17 inch.

HUNTLEY:

Climatic conditions for the month of November were about average, and on the whole, were favorable for perennial crops and fall-sown grains. Precipitation, mostly in the form of wet snows, reached a total of 0.77 inch, which is the 28-year average for this station. This moisture, together with the above-average precipitation received in October, should carry crops into the winter in good condition. Although minimum temperatures were usually below the freezing mark each day, and two subzero readings were recorded, the ground is still unfrozen, due largely to several fairly warm days in the month. The average hourly wind velocity was above normal as a result of the chinook winds that followed the storm periods.

Winter grains made some growth during the month, but because of the late date of emergence on some tillage methods the condition of the crops is not uniform on all plots. The winter wheat in the stubble rotations is especially backward.

Field work consisted of seeding crested wheatgrass, threshing corn, and burning weeds.

Maximum temperature, 55°; minimum, -8°; precipitation, 0.77 inch.

SHERIDAN:

Except for two short periods, one immediately after the middle of the month and again the last of the month, temperatures for November were mostly below the station average, about 3° low for the month as a whole. Precipitation was 0.63 inch above the average for the month, but snow lay on the ground for only short periods, and the month ended with the ground bare. Wind movement was above the average but with no soil blowing, the surface of the soil being either too wet to blow or frozen.

Although total precipitation since the middle of July still remains low, 2.01 inches, even below that of last year, surface moisture conditions are much better than last year. With the greater part of the precipitation falling only in the last month, with practically no evaporation, moisture has penetrated to a depth of from 6 to 8 inches, as compared with practically no moisture in the surface foot last year at this time.

Fall grain has emerged to any extent only in the 1st and 2nd series of the variety planting, where the fallow was dam listed through the summer. In the 3rd series, plowed and surface cultivated as usual, only a trace of grain has emerged. The remainder of the seed has germinated and appears to be in good condition.

Very little field work could be accomplished during the month, on account of weather conditions and the wet surface soil. A few Russian thistles were raked and burned, sorgo was shredded, grain sorghum varieties were threshed the last of the month, and some grain was cleaned.

Yields of the grain sorghums were quite variable, apparently on account of variable soil conditions, ranging from only 3.2 bushels per acre on one plot to 37.8 bushels on another, for one variety. Yellow Highland yielded the best average for 3 plots, 30.3 bushels per acre, with Early Kalo next, 27.6 bushels.

Maximum temperature, 58°; minimum -6°; precipitation 1.39 inches.

DICKINSON:

Precipitation during November amounted to 1.41 inches. This is 0.90 inch above normal and is the heaviest November precipitation recorded since 1922. In only 2 years has a greater November precipitation been recorded in 47 years of record.

A rain of 0.63 inch fell on November 1. About 6.5 inches of snow November 10 to 12 and light snows on the 20th and 25th made a total of 10.7 inches of snowfall for the month.

The minimum temperature of -10° was relatively mild for the month, but snowy, blustery weather continued to lower the mean temperature to 4.3° below normal. Mild weather near the middle of the month and again at the close melted most of the snow.

Precipitation in 1938 to the end of November amounted to 16.47 inches or 1.8 inches above normal for the 11 months.

The soil surface was wet or covered with snow the whole month, so that fall grains were not injured by drying. Alternate freezing and thawing toward the end of the month was not altogether favorable. On stubble fields the water penetrated 8-12 inches by the end of the month.

Livestock in the area have ample roughage and continued in good condition at the end of the month.

Maximum temperature, 53°; minimum, -10°; precipitation, 1.41 inches; snowfall, 10.7 inches.

MANDAN:

The month as a whole was moderate as to temperatures, whereas the precipitation nearly doubled the normal. Most of this precipitation occurred during the first half of the month, and a greater part of it went into the soil, as there was very little frost in the soil at that time. Soil samples at the end of the month showed good moisture in the first foot of wheatland. The surface layers were frozen to a depth of 4 or 5 inches. Stubble land and land with standing corn stalks has a fair covering of snow at this time, but fall plowing, fallow, and most corn stubble are free from snow.

Maximum temperature, 50°; minimum, -8°; precipitation, 1.04 inches; snowfall, 8.6 inches.

Preliminary Productivity study at Mandan

It has been repeatedly pointed out in connection with programs of soil restoration and soil maintainance, that continued cropping to such crops as have recently come to be regarded as "soil depleting" has in the main been responsible for the marked decline in productivity of soils in the older agricultural regions. This has been regarded as especially true on those soils which have developed under humid climates. Not so much is known concerning the effect of such cropping on the productivity of the soils which have developed under arid or semi-arid climates. It is however definitely known that many of the latter soils are naturally richer in organic matter, hence are potentially more productive than many soils in humid sections. It remains to be determined, from experiments already under way, whether or not soil productivity under so-called dry farming conditions has been maintained, or if it has declined as under humid conditions.

A preliminary study of the trend of corn yields during 25 years at Mandan, reveals that productivity appears to have been maintained at least during the first 15 years, and while there appears to be a decline during the last 10 years, it seems at this time that most of this decline may be ascribed to a preponderance of drought and to other factors than soil.

In the absence of examination of the chemical constituents of the soil --especially the nitrogen content -- the first step in the present preliminary study was to take the annual average yields of total corn in the main field, and examine their secular trend if any. This examination showed slight downward trend in the second 5 year period, a positive upward trend in the third 5-year period, and a downward trend during the

fourth and fifth 5-year periods. These trends appear to be correlated with rainfall and other climatic factors affecting corn growth. Two failures due to extreme drought during the last 5 year period appear to be the main influence responsible for the downward trend of that period.

The second step in this study was to determine the percentage relation between the average yield of all plots of corn and the yields under certain types of cropping, i.e. continuous cropping, alternate cropping, and yields in certain types of soil building rotations. The results from this part of the study showed after the first 10 years, below average yields under continuous and alternate cropping during most years when precipitation was average or above. In manured fallow rotations 71 and 72, there appeared to be a positive upward trend in yields with the progress of the years. In the sweetclover green manure rotations 31 and 32, and rotations 41 and 42 where grass and alfalfa are maintained for a 3-year period, productivity appears to have been maintained.

While these studies are in every way preliminary, they point to a field of study which should be decidedly productive. They may suggest the need of systematic examination of the soils in various rotations with the view of testing the validity of many unsupported statements regarding the reduction of soil fertility in the dry plains.

BELLE FOURCHE:

The weather was approximately normal most of the month, but a cold wave occurred during the fourth week. Zero or subzero temperatures were recorded on November 21, 22, and 23, and the mean temperature for the month was 3° lower than the 31-year average for November. The precipitation was slightly in excess of normal, but it was distributed in amounts too small to be of value to crops. Nearly all the precipitation was received as snow, but high winds removed practically all the snow from cultivated fields. An unusually high wind prevailed for about 36 hours on November 24 and 25, but no soil blowing took place.

Moisture has pentrated to a depth of 1 to 2 inches on fields where standing corn stalks or heavy small grain stubble retained the snow, but the surface soil remains too dry for any possible germination of fall grain on other cultural treatments. Considerable snow was received over most of the range area north of Newell, relieving the serious shortage of water for livestock, but the benefit to vegetation will be very limited, as the snow was badly drifted.

Grass was seeded on 14 plots in Field C early in the month; and late fall cultivation of plots, and listing of roadways to control soil blowing was completed.

Maximum temperature, 58°; minimum, -12°; precipitation, 0.60 inch.

ARCHER:

The month of November as a whole was rather cold and unpleasant. High winds caused some soil blowing on the lighter soils of this region. No heavy storms occurred. The total precipitation for the month was 0.08 inch below the 25-year average.

Notwithstanding the unfavorable weather conditions, winter cereals generally are in good condition. In the Torrington district, where the soil is rather light but produces relatively large yields of winter wheat, large acreages have been seeded with the chisel or lister drills in rows 20-28 inches apart. Good stands have been obtained, and the growth is almost ideal. Notwithstanding the heavy winds, only slight soil blowing has occurred.

The winter grain in the Nunn district of Colorado is in good condition. Stands and growth are better than in 1937 at this time of year. East of Nunn and throughout southeastern Wyoming the large amount of forage, especially sorgo, is a striking feature. Winter pastures generally are well covered with cured grasses, and livestock are in very good condition.

The station force was reduced to a winter basis November 10. Work at the station has consisted of repairing roads and preparing yards and feed for winter.

Director W. L. Quayle visited the station November 21.

Maximum temperature, 60°; minimum, -2°; precipitation, .32 inch.

NORTH PLATTE:

Since the middle of September only 0.26 inch of precipitation has been recorded. According to the Weather Bureau records, the precipitation for the year to date is 3.79 inches above normal. The mean temperature for the month was 35.3° or about a degree below normal.

The winter wheat throughout western Nebraska continues to look good. The crown or secondary roots have developed very little this fall. Normally these roots are well established at this time of the year, but at present they are only a few inches in length. This condition is prevalent throughout Nebraska, and serious damage is reported in Kansas. In sections of the State where fall pasturing of wheat is practiced, very little stock is being grazed on wheat because of the danger of uprooting the plants. In this locality the wheat will probably come through the winter in good condition if a little moisture is received at frequent periods, and if wind damage is not too severe. The cause of this abnormal condition of the wheat has several explanations, such as the dry surface soil of the seed bed, high temperatures during September and October, and there is an aphid found in the wheat this fall that some people think has contributed to this condition.

The corn was husked early in the month and averaged about 7 bushels per acre. The quality as only fair. The Early Kalo in the D. L. A. plots averaged 38.3 bushels after fallow, 20 bushels after winter wheat and 26.3 bushels on the continuously cropped plots. The value of a good grain sorghum has certainly been demonstrated this year.

Maximum temperature, 64°; minimum 0°; precipitation, 0.23 inch.

AKRON:

Precipitation amounting to 0.44 inch very early in the month proved temporarily beneficial to the harrassed winter wheat, but by the end of the month it was again looking very low in vitality. Winter wheat in much of this section has never established its secondary roots. Whether this will render it especially susceptible to winter injury remains to be seen.

The weather of November was cool, but open and rather uniform. This is the first month since May to exceed the average monthly precipitation. The established average for November at this station is 0.50 inch. Field work was well completed by the end of the month.

Maximum temperature, 68°; minimum 0°; precipitation, 0.68 inch.

COLBY:

November was a dry and generally pleasant month. Precipitation was recorded on only two dates, 0.16 inch in the form of 2 inches of snow on the 6th and a trace in the form of a misty rain on the 18th. The snow drifted some and stayed on the ground about two days. The minimum temperatures ranged between 0° and 4° from the 22nd to the 27th.

Wheat made some slight growth during the month, but remains in a very uncertain condition. The volunteer wheat has practically all died and the drilled wheat on crop land is still unsprouted in most cases. On most of the summer fallow fields it covers the ground but has no brace roots, except on very few fields where the precipitation since seeding has been sufficient to wet the surface several inches. Where it does not have the brace roots, it can be pulled up readily.

Sorghum threshing on the project was finished early in the month. The Colby milo yielded from 1.7 bushels to the acre on plot M.C.F to 18.1 on the fallow plot in rotation 156, and averaged 9.9 bushels. Only the fallow plot of kafir yielded any grain, and that was 0.9 bushel to the acre. The feterita averaged 9.6 bushels and the Early Sumac sorgo averaged 2.5 bushels.

The late fall tillage was done on the 19th. This work was delayed waiting for moisture until it was felt that delaying longer was taking a chance of encountering frozen ground. The ground was slightly moist but was hard and turned up cloddy in most cases. The straw and manure as top dressing for wheat were applied that day also.

The last two days of the month were spent in running lister furrows down each alley and along the edges of the roadways to help check blowing. The ground was generally hard, and in many cases huge clods were turned up.

Maximum temperature, 75°; minimum, 0°; precipitation, 0.16 inch; snowfall, 2 inches.

HAYS:

Only 0.33 inch of precipitation has been received since September 13. At the close of the month there is a layer of thin ice on the creek, but there is no frost in the ground. The weather has been fine for all kinds of outside work except tillage work, which is not so good due to the extreme dry soil conditions. No tillage work is being done.

Winter wheat that germinated and survived the first few weeks is still alive, and some of it looks good. On plots where the wheat was stubbled in, none of the wheat has germinated. Only a trace germinated on ground where the stubble was burned just previous to drilling. On late disked stubble and on late plowing there is an extremely thin stand and poor growth. On early preparation there is from 50 to 70 percent stand, and it has made a moderate amount of growth. On fallow, the stand varies from 65 to 90 percent. The growth is considerably better than on cropped land and most of it looks good. Seeded on plots where the wheat was preceded by sorghum crops there are no plants within 60 inches of the sorghum rows, and there are only scattering plants in a strip of ground between 60 and 80 inches from the sorghum rows. Beyond 80 inches the stand is better and the growth approaches the growth of the wheat on clean fallow.

Most of the wheat plants, even on fallow, are supported only by a single root leading from the plant into the soil. Some of the more thrifty plants have developed from 1 to 5 secondary roots from 1/8 to 1 inch long which extend down into the surface layer of loose dry soil, but none of these roots have penetrated or even entered the hard layer of dry soil below which there is a limited amount of moisture. Attached or clinging to some of these roots are many fine particles of soil indicating the roots are alive, but the growing points of these roots are far above moist soil. Needless to say all the wheat is much in need of rain. Throughout this area the wheat is extremely spotted, and the best of it has none too good a chance.

Maximum temperature, 80°; minimum, -2°; precipitation, 0.30 inch.

GARDEN CITY:

The average mean temperature was 2° lower than the 23-year average, (1915-37). Dust occurred on five days, some came in from other areas and and some was local. The surface soil is very dry, and there will probably be considerable blowing next spring unless moisture is received, if this month is a sample of what can be expected.

Field work consisted of weighing forage yields and taking soil moisture samples.

Station visitors were Mr. Parker and Mr. Longley, Soil Conservation Service at Liberal, Kans.; Dr. G. R. Stewart, Research Division of Soil Conservation Service, Mr. Porterfield, Soil Conservation Service, Amarillo, Texas; Earl W. Parsons and H. M. Watenpaugh, Bureau of Agricultural Economics, Amarillo, Texas; and Vocational Agriculture class from Holcomb, Kans.

Maximum temperature, 77°; minimum, 4°; precipitation, 0.12 inch.

TUCUMCARI:

November was unusually cold, the second windiest November on record, and below normal in precipitation. Warm, clear weather early in the month enabled workers to complete threshing, hauling of stover, and other outside work with very little delay.

Throughout the last eight days the mean temperature averaged about 15° below the long-time November mean. Mean for the month was 3° below normal.

Wind movement was unusually high the first half and low the last half.

Precipitation of 0.34 inch brought the total for 1938 to date to 11.32 inches, exactly a 4.5 inch deficiency for the 11-month period.

Threshing and fall plowing were completed soon after the middle of the month, and other late fall work was completed before the month's end.

Livestock are in good condition. Ranges are comparatively short, but with heavy shipments of cattle having taken place it is likely those remaining will winter well unless heavy snows occur.

Maximum temperature, 76°; minimum, 11°.

DALHART:

While rather open fall weather prevailed, the chief climatic factors which are remembered for the month are the several days of high winds (transporting dust, sand, and thistles), that the first killing freeze of the fall was recorded on the morning of the 4th, and that from the 12th on freezing was recorded for each day.

The late first freeze prevented early heading of some of the late heads and as a result threshing is just well under way. Because of the light yields the threshing is going to be a small task. It is indicated from those threshed that it will be an exception if any plot of grain sorghum exceeds 10 bushels in yield. High winds have delayed stover weighing as well as threshing.

Wheat and rye have good top growth, especially where seeded early. The rye plots seeded after cowpeas have thinner stands but good plants. One plot of oats was seeded early and shows no injury now; it is fully as rank as any of the rye or wheat.

The mean temperature for the month was 39 degrees; the actual maximum was 72° on the 11th; the minimum was 7° on the 24th; precipitation, .04 inch.

BIG SPRING:

Weather conditions were generally favorable for field work, although minimum temperatures were somewhat lower than normal. About an inch of snow was received on the night of the 6th, which was quite unusual for that time of the year. This snow was accompanied by the first killing frost of the year, when the minimum dropped to 26° and killed all crop vegetation. This frost date was about normal. Only one rain totalling 0.64 inch was received during the month, as compared with a normal for the period of 1.11.

The winter wheat plots were planted November 5 and emerged to good stands the 15th. The soil moisture supply is so low that they are not making much growth, and it is very doubtful if they could survive much wind.

Cotton picking in this section is just about completed. The freeze of November 6 reduced the potential crop of this county about 20 percent. Replanting three and four times last spring caused the farmers to get started with a late crop, and as a result there were many immature bolls which did not open after the freeze. The picking of station cotton was completed November 16, the earliest date in many years. Other station work has consisted of heading increase milo and late maturing sorghum plots, harvesting peanuts, and threshing sorghums; the latter job was completed November 30. Yields have not been computed; but they will probably be well above the average.

Cattle for this year's feeding tests were received November 1, and were kept on preliminary feed until November 29, when they were graded, weighed and divided into test lots. J. H. Jones and G. W. Barnes of the Texas Experiment Station assisted with this work.

Maximum temperature, 85°; minimum, 12°; precipitation, 0.73 inch.

LAWTON:

Whatever else the bewildering year of 1938 brought, it brought the latest snow in the spring, April 7, and the earliest one on record in the fall, November 7. The April snow with its freezing temperatures and high winds set the stage for crop failures of small grains. Early November following the unusually warm temperatures of October carpeted the earth with snow while the foliage of trees, shrubs, and flowers was yet uninjured by cold. Tersely stated, the 1938 growing season was just a comparatively short period between snow storms, excessively wet in its inception, and disastrously dry from June 25 to November 2.

Gently falling rains to the extent of 2.06 inches, November 2 to 6 provided for the emergence of small grains that were seeded in dry soil earlier in the season. A very appreciable acreage of wheat and barley was also seeded the latter half of November on seed beds that were prepared after the early November rains. Emergence has been poor on these late seedings, and growth of the earlier seedings was sharply restricted throughout the month. Volunteer crops of small grains made their first appearance about November 15. The general condition of wheat, oats, and barley remained very poor on November 30. Not much improvement can be expected until early spring growth is renewed, probably in February, and additional moisture in the meantime will be very essential.

The early November rains provided enough moisture to perform all the necessary fall and winter tillage on plots and fields in good shape. The total precipitation for the month was 2.06 inches. Minimum temperatures of 17°, recorded on November 23 and 27 represent the low point for the season. The mean monthly temperature was only 1.5° below normal.

WOODWARD:

Precipitation for the month totaled 0.49 inch. With the subnormal precipitation for August, September, and October this is the driest fall on record at this station. There have been only six years in the past twenty-four when precipitation of over an inch was recorded in December and only one year when nearly 3 inches fell. There have been only seven years in which over an inch fell in January and only three years in which over an inch fell in February.

All wheat plots on the west place were seeded with the deepfurrow drill except plots to be compared on types of drills. The Demoster deep-furrow drill was used to ridge the field to help in preventing wind erosion and to get the seed down into moist soil where possible.

Wheat seeded early in September is thin and has poor root development. Some of the plants began developing secondary roots following the 0.37 inch of rain received November 2; but many of these roots developed only slightly. Top growth of wheat over the country generally is insufficient to form much of any protection against soil blowing.

Winter growing species of grass have failed in their customary habit of renewing growth in the fall. It has been too dry for fall-seeded grasses to emerge since the middle of August when only the prompt germinating strains gave satisfactory stands. These have barely made sufficient vegetative growth to withstand wind erosion and hard freezes, although blue grama produced spikes on 3 inch stems sixty days after emergence.

General field work consisted of drilling wheat plots, cutting stalks, taking soil moisture samples, threshing grain and weighing forage from plots, spreading barnyard manure on windbreaks to prevent soil blowing, checking nursery, gathering seed, making cuttings, working on dam, pulling trees, and placing brush on dam to prevent water and wind erosion.

L. S. Ellis, Director of the Oklahoma Experiment Station, W. L. Hutchins and Forest Burns of the Oklahoma State Board of Agriculture were station visitors. V. J. Simpson, Engineering Aid, Dalhart, Tex.; F. E. Neff, Project Manager, Dalhart, Tex.; R. J. Gray, Jr. Agricultural Economist, Dalhart, Tex.; Ed M. Parsley, Jr. Soil Scientist, Springfield, Colo.; Wm. L. McMullen, Asst. Agricultural Economist, Elkhart, Kansas; C. C. Waneka, Range Specialist, Amarillo, Tex.; G. T. McDaniel, Jr. Agricultural Economist, Dalhart, Tex.; Martin Reinholt, Station Project Supervisor, Albuquerque, New Mex.; J. E. Wagner, Jr. Agricultural Economist, Springfield, Colo.; W. B. Smycler, Jr. Engineer Aid and L. T. Moberly, Jr. Soil Scientist, Elkhart, Kansas, engaged in the purchase and revegetation of submarginal land, spent two days studying grass work at the station and neighboring ranches.

Maximum temperature, 81°; minimum, 10°; precipitation, 0.49 inch.

PENDLETON:

Precipitation during November amounted to 2.04 inches, the 10 year average is 1.51 inches. Rain or snow fell on 13 days during the first half of the month. Throughout the Columbia Basin considerable seeding was done during the first half of the month. Cool weather during the period November 20 to 29 delayed germination of the late fall sown wheat. Some seeding was done on the station during November, mostly fall plowed plots that were too dry to seed at the time the fallow plots were seeded. A group of phosphate fertilizer trials was also sown during the month. None of the November seedings have emerged. Wheat sown on fallow plots about October 22 emerged November 7 with excellent stands.

Maximum temperature, 61°; minimum, 12°; precipitation, 2.04 inches.